Detachment 12
Space and Missile Systems Center

Mission Briefing
For
Lt Gen Brian A. Arnold
SMC/CC

Col James A. "Mouse" Neumeister

29 June 2001

Forging the Shape of Military Space for the 21st Century

U.S. AIR FORCE

OVERVIEW

SMC DETACHMENT 12

- **MISSION, VISION, GOALS, TEAM, TASKING, FUNDING, RECENT ACHIEVEMENTS, FUTURE MISSIONS**
- **ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)**
- **DoD SPACE TEST PROGRAM (STP)**
- **R&D SPACE & MISSILE OPERATIONS PROGRAM (RDSMO)**
- **WRAP-UP**

DET 12 MISSION

Detachment 12, Space and Missile Systems Center, serves as the primary provider of launch capability and spaceflight for the entire DoD space research, development, test, and evaluation community

DET 12
MISSION ESSENTIAL TASKS

Mega-SPO in terms of breadth and depth of mission and programs

- Executes over 30 missile missions in various stages of mission design, acquisition, and launch at any one time—cradle to grave
- Executes over 30 spacecraft missions in various stages of mission design, acquisition, launch, and on-orbit operations at any one time—cradle to grave
- Performs as Multi-Mission SOC supporting Det 12 and other spacecraft missions

DET 12 VISION

Smart, dedicated, energetic team of aerospace and support professionals providing recognized world-class leadership in the design, acquisition, launch, and operation of one-of-a-kind space and missile missions for DoD.

DET 12 GOALS

- **Keep our current work energized**
  - **Proactively manage missions throughout entire Det 12 period of responsibility**
    - **Strong teaming relationship with the rest of the DoD RDT&E community**
  - **Attack our higher-risk space and missile missions with a risk-reducing, success-oriented mentality**
    - **Drive lessons learned into current and future missions**
  - **Continue to tie Det 12 missions to warfighter requirements and educate operational users on Det 12 contributions**
  - **Continue to document and refine Det 12 processes**
  - **Conduct a continuous, proactive public affairs campaign to document and educate Air Force, DoD, and the public on Det 12 efforts, successes, and contributions**
  - **Continue to develop Det 12 Intranet and Internet resources as valuable reference libraries to improve internal and external customer knowledge and interaction**
  - **Be a proactive presence in the space and missile community**
    - **AIAA Small Satellite 2001 Conference**
    - **AIAA Space 2001 Conference**

DET 12 GOALS (CONT'D)

- Take care of our people
  - Provide challenging, interesting work and a positive work environment
  - Provide the ADPE tools to maximize productivity
  - Provide training to better prepare our people for the job today and the jobs they'll face tomorrow
  - Fill vacant personnel billets to improve program execution and level workload
  - Prepare the best-written OPRs, EPRs, PRFs, and awards and decorations in SMC
  - Provide properly-timed and properly-focused follow-on assignments
  - Be a positive presence in the Team Kirtland and Albuquerque communities

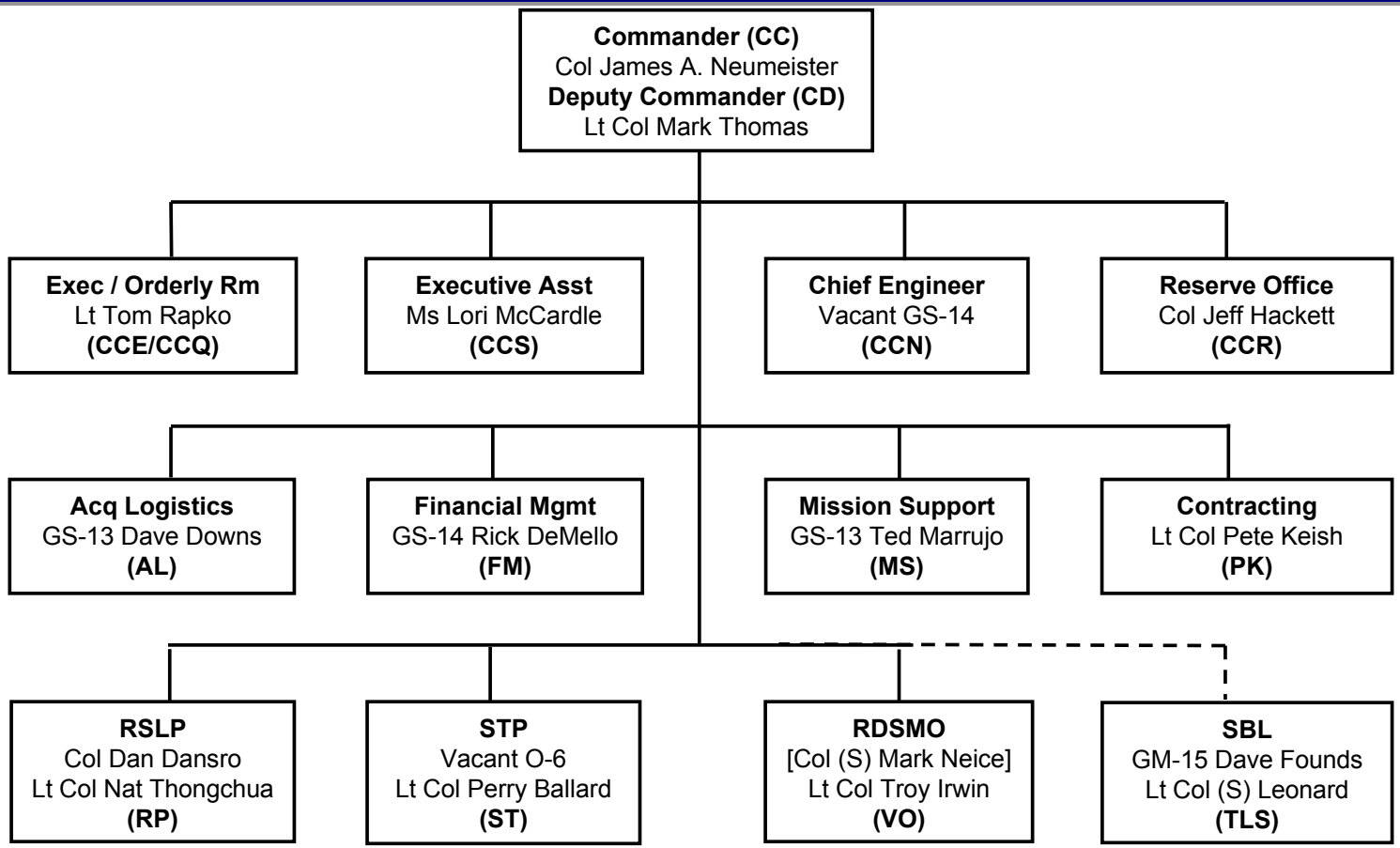
Take care of each other both "on and off the field"

DET 12 TEAM

- 275-Person Government Organization (190 @ KAFB)
- $145M FY01 Budget [$58M is Customer Funding]
- 3 PMD Directed/Funded Missions Under SAF/AQS
  - —Rocket Systems Launch Program (RSLP)
    - Owns retired MM I/MM II rocket motors; provide for DoD user needs
  - —Space Test Program (STP)
    - Provides access to space for DoD experiments
  - —R&D Space and Missile Operations (RDSMO)
    - Manages two R&D satellite operations complexes and multiple deployable telemetry, tracking, and commanding (TT&C) terminals
    - Provides launch and on-orbit control of R&D space assets

Innovative multi-program SPO with T&E Capabilities

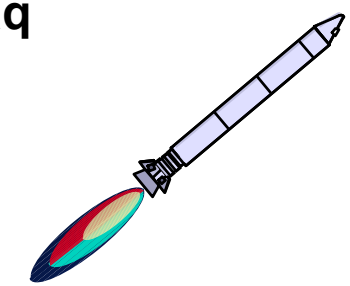
DET 12 TEAM



Tecolote Research **Mr Mike Mahoney**	**Muniz Engineering** **Todd Hellner**	**GRCI** Mr Steve Hogan	**TRW** Mr Ron Miller	**Aerospace Corp** Dr Victor Matricardi	**General Dynamics** Mr Phil Darling	**Lockheed Martin** Mr Phil Shiver	**EDSI** Mr Jon Romero

ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)

- **Engineering Logistics**
  - Store deactivated Minuteman (MM) assets
  - Perform aging & surveillance of existing ICBM assets
  - Refurbish MM motors/boosters
- **Orbital and Sub-orbital Program**
  - Provide target vehicles for BMDO, NMD, TMD, etc.
  - Execute sounding rocket and ICBM tests
  - Provide space boost for R&D programs
- **Provides START and ABM Treaty assistance**
- **Supports UN Security Council Resolutions on Iraq**
- **Accomplishment history:**
  - 632 Launches
  - 26 Booster types
  - 22 Launch sites



"Over 20 Flight Tests per Year"

DOD SPACE TEST PROGRAM (STP)

- DOD Program, managed by USAF
- Spaceflight for DOD R&D experiments prioritized by the Space Experiments Review Board (SERB)
- Specific Services Provided:
  - Mission Planning and Execution
  - Payload integration and test
  - Launch
  - One year of on-orbit operation
- Flight of small payloads on Expendable Launch Vehicles, Shuttle, and International Space Station (ISS)
- Services for reimbursable programs

10 RDT&E Missions per Year

RESEARCH AND DEVELOPMENT SPACE AND MISSILE OPERATIONS (RDSMO)

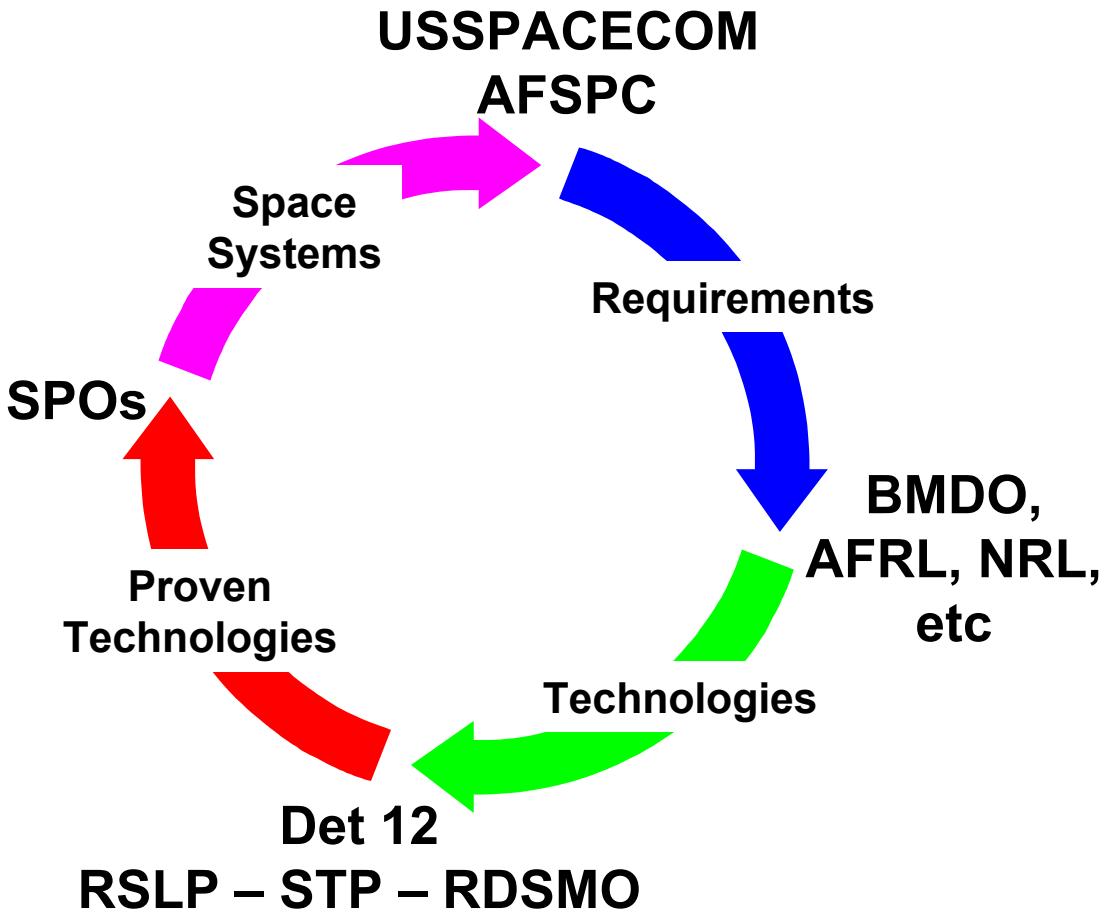
- Prepare for and conduct on-orbit operations of USAF, DoD, and other R&D and post-operational satellites
  - STP, AFRL, NRL, DoE, et al
  - DSP, DSCS, et al
- Provide a space operations testbed for rapid prototyping, test and evaluation, and system activation
- Provide worldwide access to space assets where fixed sites do not exist
  - Factory and launch base compatibility testing
  - Booster and on-orbit satellite support

45 Spacecraft or Booster Supports in Planning, Readiness or Operation in 2001!

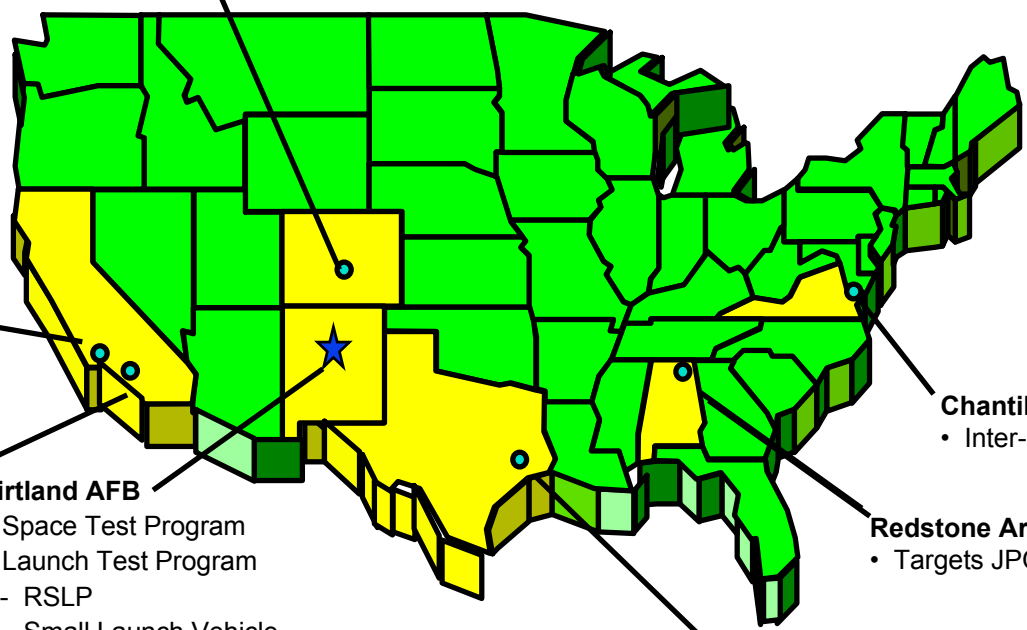
SPACE-BASED LASER PROGRAM (SBL)

- Commander and Orderly Room support to SMC/TL personnel assigned to Kirtland AFB
- Additional support as determined and agreed to by SMC/TL and Det 12—MOA in work

SPACE CAPABILITIES
"CIRCLE OF LIFE"



DET 12 LOCATIONS



Schriever AFB
- Center for Research Support (CERES) at the National Test Facility

Vandenberg AFB
- Det 9 Liaison

Los Angeles AFB
- SBL Program
- SMC Sys Acq Liaison
- SPO Test Support
- Reliance Staff Spt

Kirtland AFB
- Space Test Program
- Launch Test Program
  - RSLP
  - Small Launch Vehicle
  - Missile Deactivation
  - Sub-Orbital Launch Services
- RDT&E On-orbit Mission Control (RDSMO)
  - Deployable TT&C Systems
  - RDT&E Support Complex
- Space-Based Laser (SBL) Program
- Space Single Face To Customer (SFTC)
- T&E APDP Functional Manager

Chantilly, VA
- Inter-Range Ops

Redstone Arsenal
- Targets JPO Liaison

Johnson Space Center
- Shuttle & Space Station Experiment Planning & Integration

RECENT ACHIEVEMENTS

- Deployable Supports
  - Quick Reaction Launch Vehicle (Minuteman)- Kodiak, AK--21 Mar 01
  - XSS-10 Factory Compat -- 26-30 Mar 01
  - Mars-Odyssey -- Crete and Oman (Delta II) -- 7 April 01
  - GeoLite -- Ghana and South Africa (Delta II) -- 17 May 01
  - King Set-up -- Falkland Islands -- 2 - 9 Jun 01
  - Bermuda Site Survey -- 3 - 8 Jun 01
  - Johnston Atoll Site Survey -- 21 - 29 Jun 01
  - Argentia Site Check-out -- 22 - 25 Jun 01
- Quick Reaction Demonstrator (Feb 01)
- Quick Reaction Launch Vehicle, M56, Kodiak AK—22 Mar 01
- Secured MACE II extended ops on ISS
- GPS LADO Demonstration (May 01)
- Motor Test, Static Fire (M55 April 01, M57 May 01)
- CloudSat Peer Review (Jun 01)
- Preship review for SAPPHIRE & PICOSat (KodiakStar Mission)

FUTURE MISSIONS

- Deployable Missions
  - Genesis (Delta II -- 30 July 01) -- Australia
  - B-31 (Titan/DSP -- 21 July 01) -- Bermuda
  - MAP (Delta II -- 14 Aug 01) -- Johnston Atoll
  - A/C 160 (Atlas/Centaur -- 25 Aug 01) -- Falklands
  - B-34 (Titan - 4) --- San Diego
  - Coriolis Factory Compat --Sep 01
  - MISSE On STS 105 - 1st External ISS Experiment (6 Aug 01)
  - MACE II returns on STS 105
- CANE (Apr 01 - Sep 01)
- HERA (Jul 01, Nov 01)
- IFT 6/7 (14 Jul 01/7 Nov 01)
- Motor Test, Static Fire, (SR-19 Jul 01)
- Kodiak Star (31 Aug 01)
- DTB Demonstration (Sep 01)
- ASAS (Sep 01)
- PicoSat Deployment (Sep 01)
- Navy Theater Wide (TTV 3 NET Sep 01, TTV 4 Jan 02)
- Excalibur (LFRBMT) Test (Oct 01)
- CCS-C Fly-Off (Nov 01)
- XSS-10 (Nov 01)

DET 12
COMMUNITY PARTICIPATION

- Staffed food booth at KAFB 4th of July celebration 2000
- Staffed food and career day booths at KAFB Air Show 2000
- Led KAFB in number of participants (84) and amount donated ($3,657) in American Cancer Society's Making Strides Against Breast Cancer (MSABC) walk 2001
- Participated in Albuquerque Big Brothers-Big Sisters Volunteers Into Direct Action (VIDA) in-school mentoring program 2000-2001
- Netted 593 books, two basketballs, and two decks of cards via 'Books for Baked Goods" sale for Whittier Elementary School (considered "at risk" by VIDA) 2001
- Entered multiple five-person teams in annual Big Brothers-Big Sisters "Bowl for Kid's Sake" (2000, 2001)
- Provide strong, recurring participation in SMC-AFRL Red Cross blood drives

OVERVIEW

- MISSION, VISION, GOALS, TEAM, TASKING, FUNDING, RECENT ACHIEVEMENTS, FUTURE MISSIONS
- ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)
- DOD SPACE TEST PROGRAM (STP)
- R&D SPACE & MISSILE OPERATIONS PROGRAM (RDSMO)
- WRAP-UP

ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)

COLONEL DAN DANSRO
PROGRAM MANAGER
29 JUNE 2001

DSN 246-8957

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DET 12/RP ORGANIZATIONAL CHART

U.S. AIR FORCE

SMC DETACHMENT 12

RSLP

ROCKET SYSTEMS LAUNCH PROGRAM
PROGRAM MANAGER
Col Dan Dansro
Deputy Program Manager
Lt Col Nat Thongchua

SECRETARY
GS-06
Ms. Sue Hill

PROGRAM CONTROL
FMR (GS-13)
Mr. Paul Hermanson, Acting

CONTRACTS
PKR
Maj Glen Bontly

ACQUISITION EXPERT
GS-14
Mr. Sam Kuennen

VANDENBERG LIAISON
GS-13
Mr. Sarvortam Majmundar

SMDC LIAISON
Capt Trevis Bergert

CHIEF, MISSILE ENGINEERING & LOGISTICS DIVISION
RPE (GS-14)
Mr. Earl Miles

- Booster Refurbishment
- Hera, Storm, TCMP
- Motor Storage
- Aging Surveillance
- MM II Deactivation
- SR-19 Flex Seal Modification
- PK Deact Planning
- United Nations Support

CHIEF, NMD TARGETS DIVISION
RPN (Lt Col)
Maj Tony Rivera

- Launch Services (ICBM & Sounding Rockets)
- Treaties (START, ABM, INF)
- MSLS Sub-Orbital Flights
- Orbital & Sounding Rocket Contracts
- LRALT
- Navy Area Wide

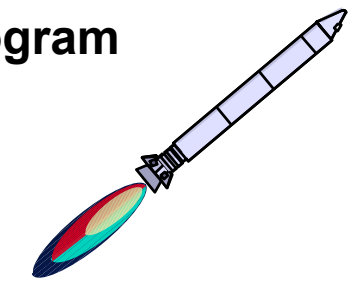
CHIEF, TMD TARGETS DIVISION
RPT (Lt Col)
Maj Ken Sebek

- Taurus
- Sub-Orbital Contract
- JAWSAT
- MIGHTYSAT
- Excalibur
- QRLV
- USFE/Scorpius
- Navy Theater Wide

DET 12/RP

RSLP

- **Rocket Systems Launch Program (RSLP)**
  - Supports RDT&E ballistic missile launches: BMDO (THAAD, PAC-3, NTW, NAW, NMD), AFRL (BMT), AFSPC, ...
- **Engineering Logistics**
  - Store deactivated Minuteman (MM) assets
  - Perform aging & surveillance of existing ICBM assets
  - Refurbish MM motors/boosters
  - Peacekeeper deactivation and reuse
- **Sounding Rocket Program, Orbital and Sub-orbital Program**
  - TMD and ICBM class target vehicles
  - Minotaur space launch vehicle
- **Provides START and ABM Treaty assistance**



"Over 20 Flight Tests per Year"

ROCKET SYSTEMS LAUNCH PROGRAM

RSLP

- Established in 1962
- Charter
  - '…A Single Agency Providing Launch Vehicle Support for Three Services on a Cost Reimbursable Basis…' SECDEF – 1972
- USAF Policy (Rocket Systems Launch Program PMD)
  - RSLP will maintain active control and management of all Air Force deactivated ICBM missile assets
  - RSLP will provide flight test mission integration and support for national R&D requirements; AF R&D, BMDO, Army, Navy, NASA.
- National Transportation Space Policy
  - '…consider use of excess ballistic missiles for space launch on a case-by-case basis, requires Secretary of Defense approval.'

ROCKET SYSTEMS LAUNCH PROGRAM LEGACY (1962 - 2001)

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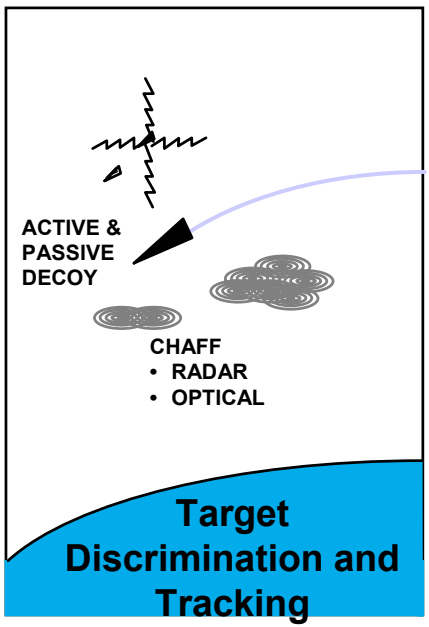
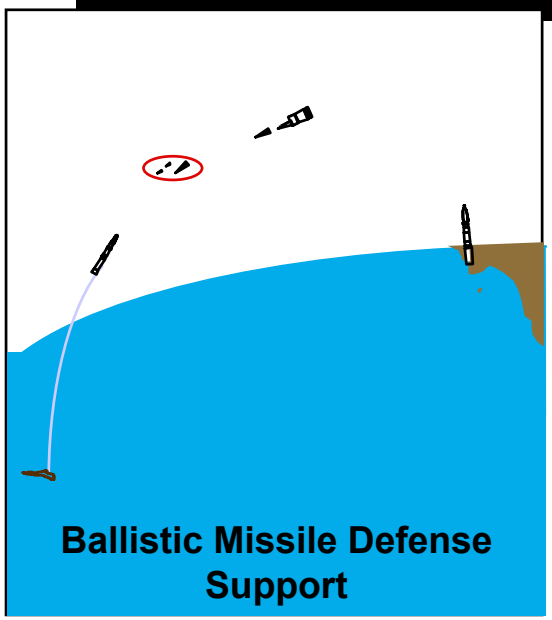
RSLP

- 632 LAUNCHES
- 26 BOOSTER TYPES
- 22 LAUNCH SITES

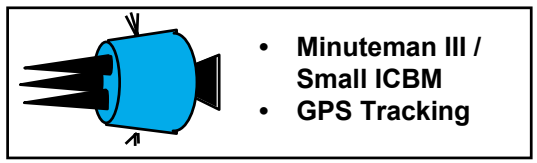


PENETRATION AIDS

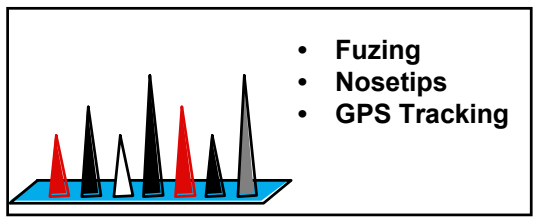


MISSILE DEFENSE TARGETS

REENTRY SYSTEMS



GUIDANCE & NAVIGATION



SPECIAL FLIGHT TEST PROJECTS

LAUNCH SITES

U.S. AIR FORCE

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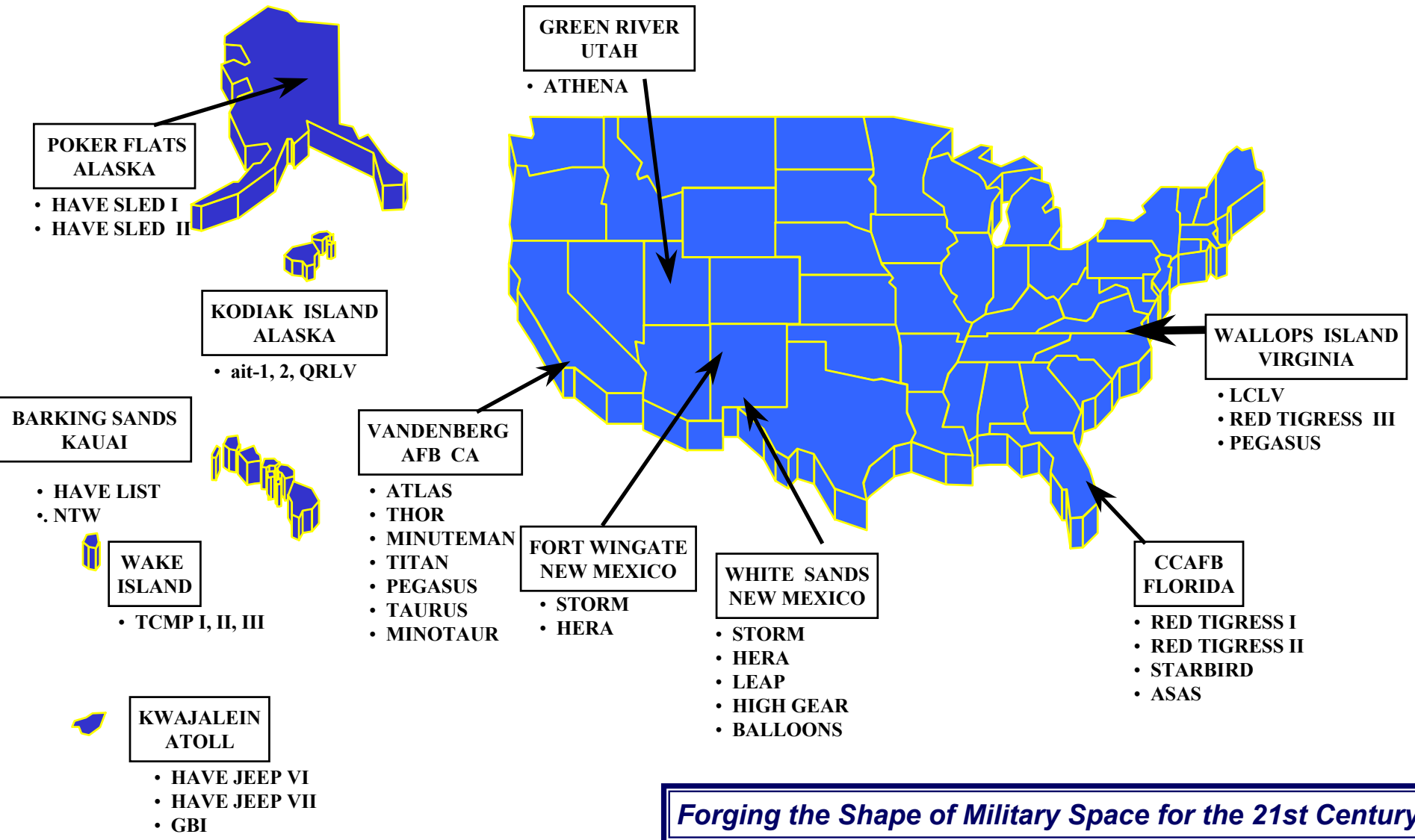

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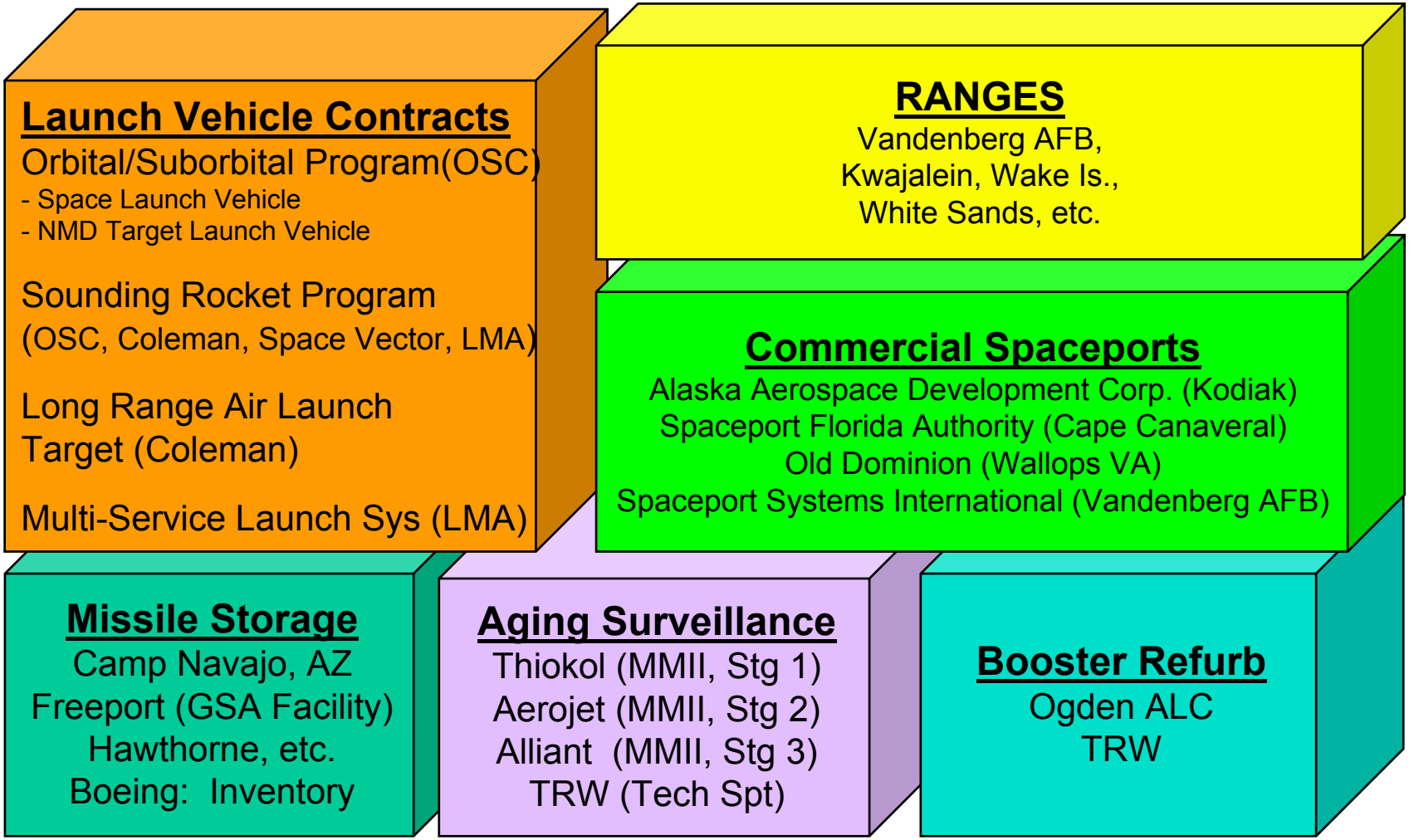
CONTRACTORS & KEY SUPPLIERS

U.S. AIR FORCE

RSLP



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MISSILE ENGINEERING & LOGISTICS

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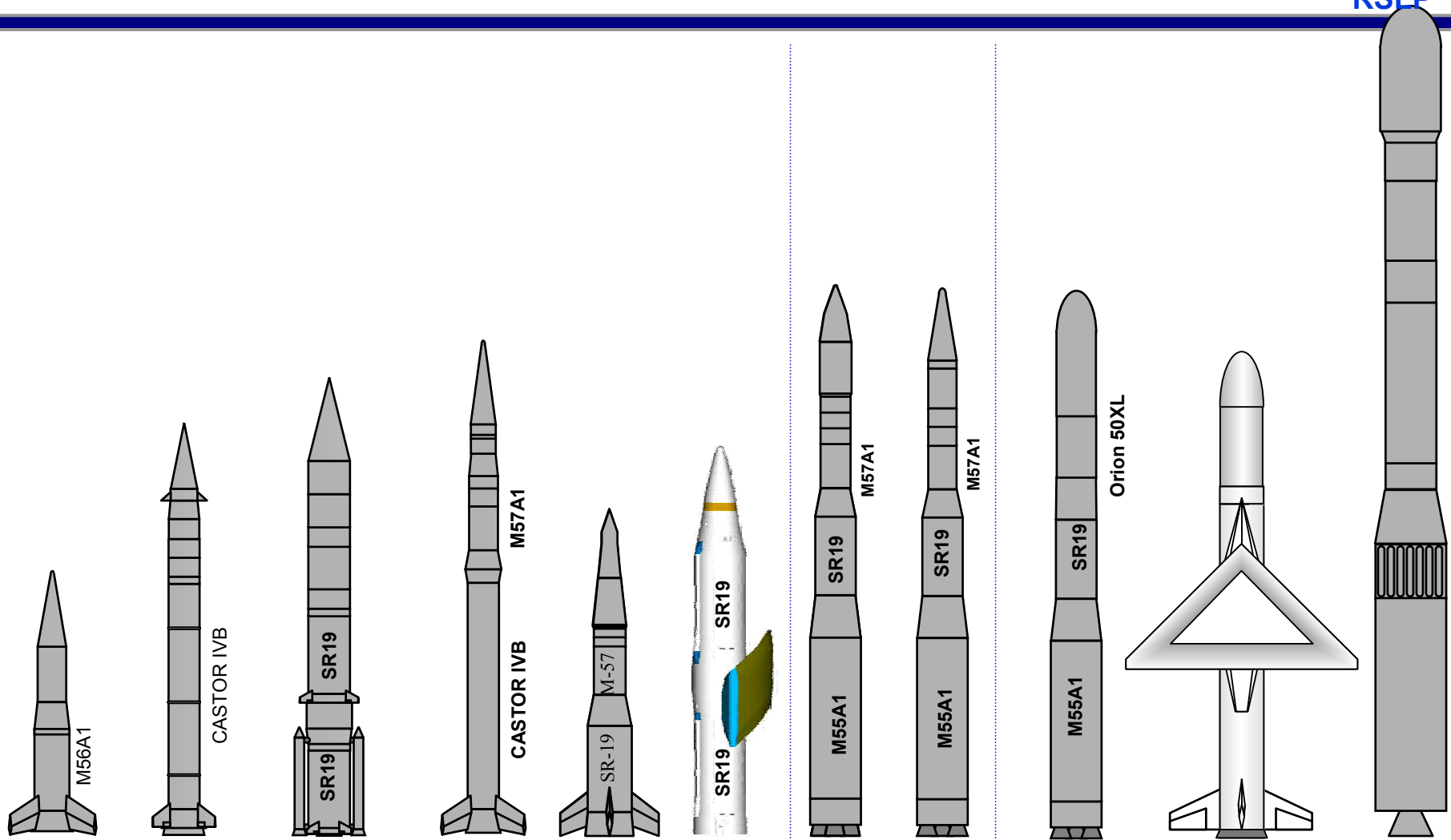
- **Motor storage: Temperature/Humidity controlled environment**
- **Aging Surveillance (A&S)**
  - Identify age related changes to Minuteman I/II assets
  - Static fires, propellant testing, etc.
  - Update service life model to predict motor reliability
- **Motor refurbishment: X-ray, refurb nozzle, replace seals, etc.**

Launch Vehicle Configurations (1/200 Scale)

RSLP



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SOUNDING ROCKET CAPABILITIES (TMD CLASS TARGETS)

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Range: 100-1,000 km

Apogee: 100-600 km

Payload Weight: 100-1,000 kg

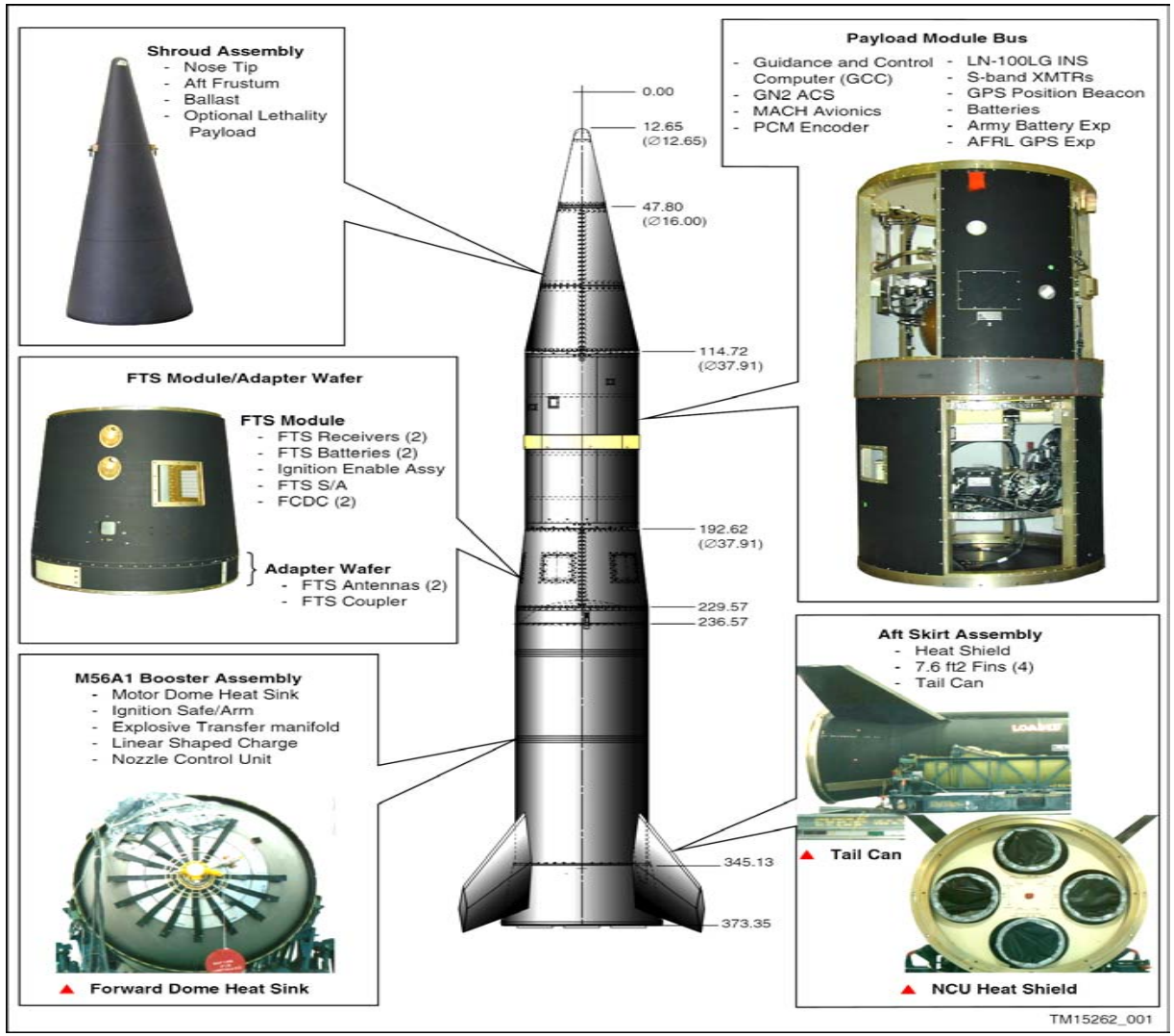
Reentry Velocity: 1.5-3.0 km/sec

Up to 10 Minutes of micro-G

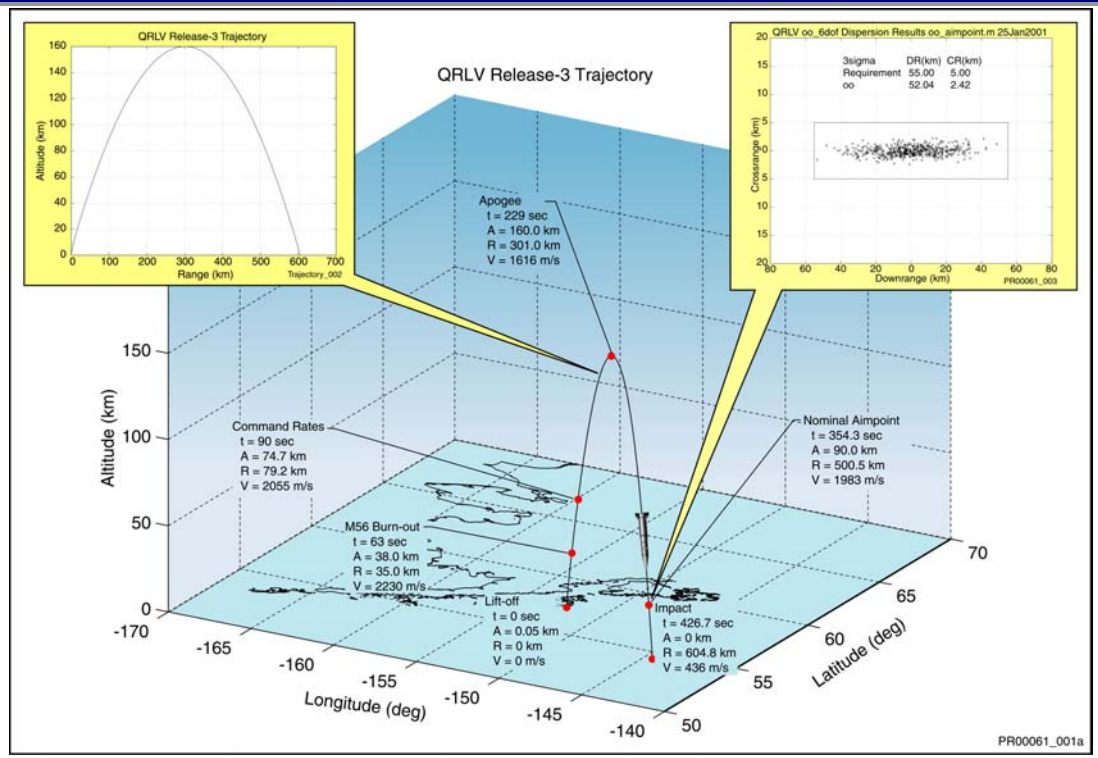
Guided or Unguided Flights

LRALT: 1,000-3,500 Km range

TMD TYPE TARGET VEHICLE



QRLV-1 SUCCESS, 22 MAR 01



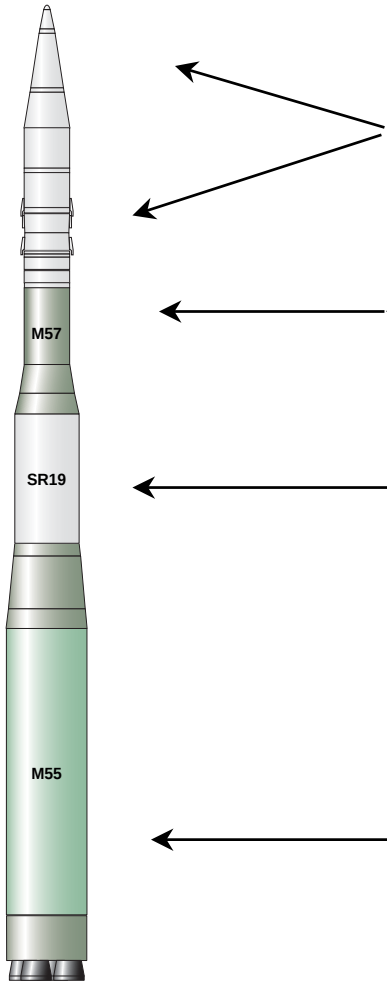
- Major objectives met 100%
  - Provided TMD target in support of Alaskan Command Northern Edge Exercise
  - Provided threat target for Navy Theater Wide AEGIS system
- Minor objectives
  - GPS experiments (BMRST, Differential GPS, SIGI, GITU)
  - Army Flight Experiment

BALLISTIC MISSILES (NMD CLASS TARGET)

ICBM Capabilities:

- Range: 7,500 km
- Apogee: 600-2000 km
- Payload Weight: 100-400 kg
- Reentry Velocity: 7 km/sec
- Up to 20 Minutes of micro-G

NMD TARGET LAUNCH VEHICLE

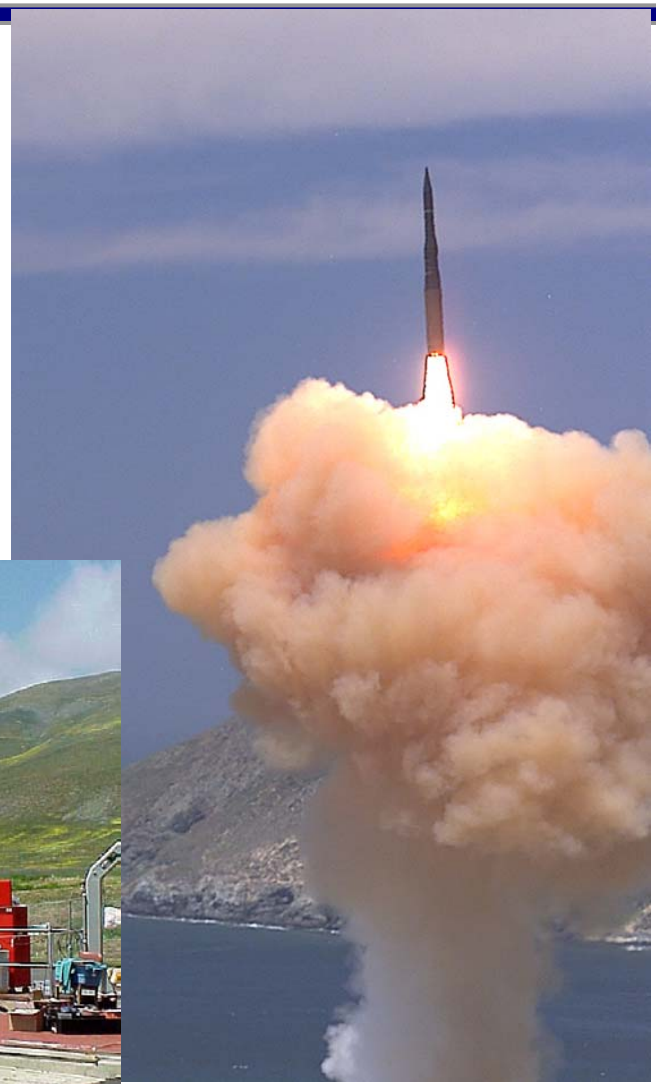


Orbital/Suborbital Program Front Section (Orbital Sciences Corporation)

Standard Minuteman II from stage 1 through stage 3

OSP TARGET LAUNCH VEHICLE

- Successful demonstration launch, 28 May 00
- Representative NMD target suite to required point in space



SPACE LAUNCH VEHICLE (MINOTAUR)

U.S. AIR FORCE

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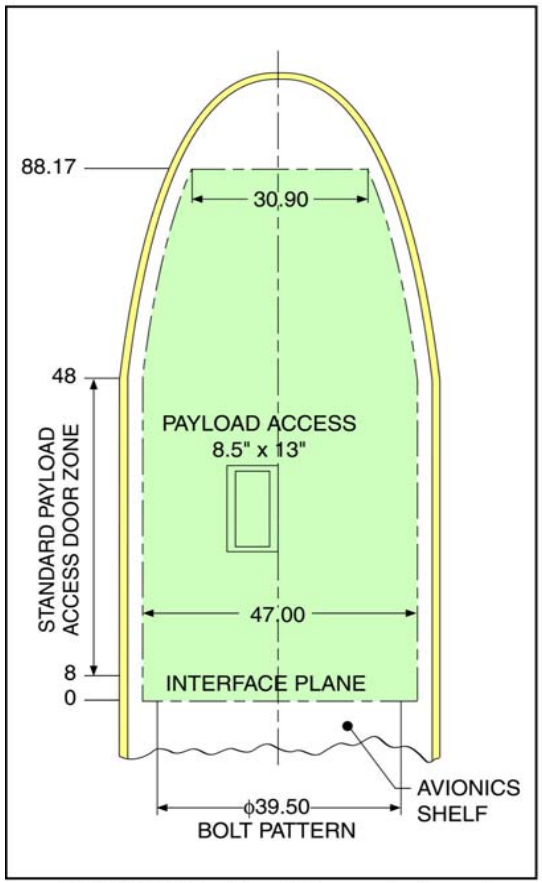
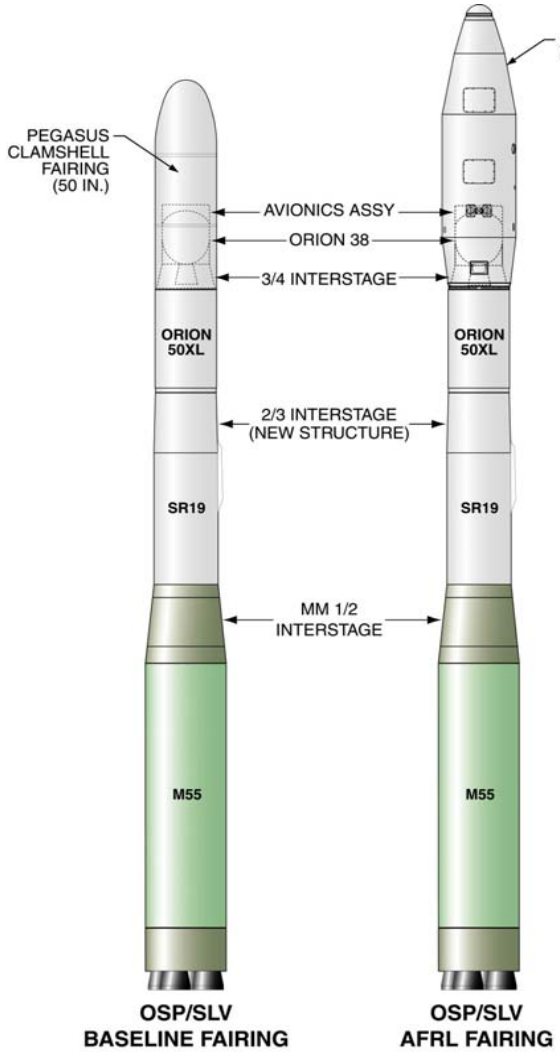
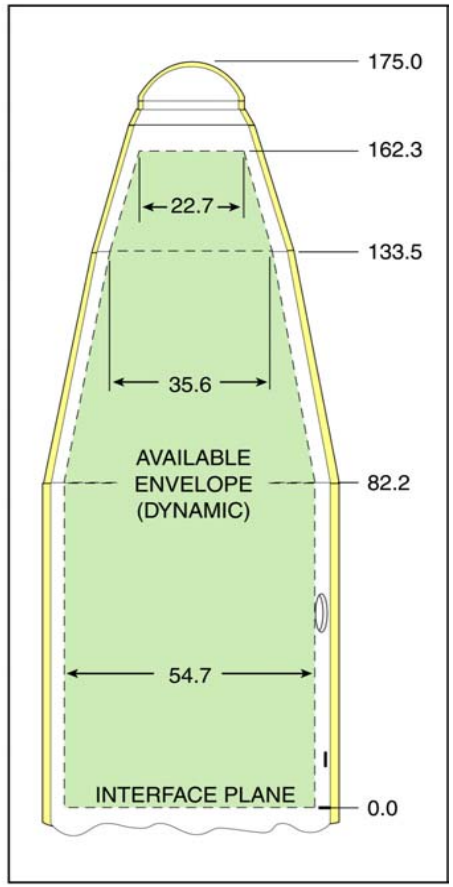
RSLP



▲ OSP/SLV Payload Dynamic Envelope (Baseline Fairing)





▲ OSP/SLV Payload Dynamic Envelope (AFRL Fairing)

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SUCCESSFUL MINOTAUR LAUNCHES OSP-1, JAWSAT

U.S. AIR FORCE

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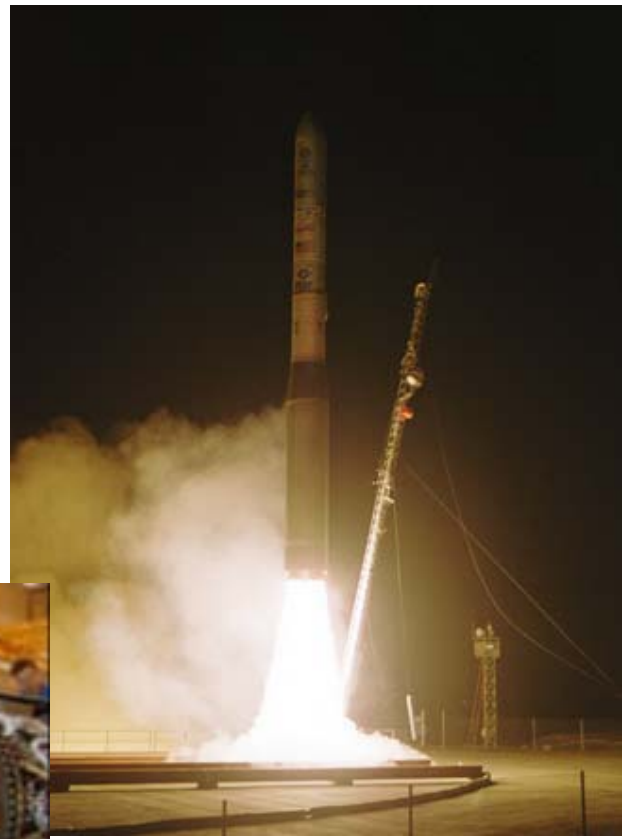
RSLP

First Launch (JAWSAT) On 26 January 00 Highly Successful

5 Satellites Delivered into Orbit



SUCCESSFUL MINOTAUR LAUNCHES
OSP-2, MIGHTYSAT

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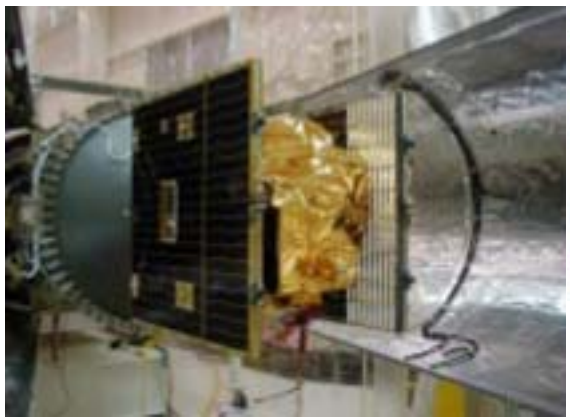
RSLP

Second launch on 19 July 2000
Highly Successful

Delivered MightySat II,
1 satellite into Orbit



THE FUTURE

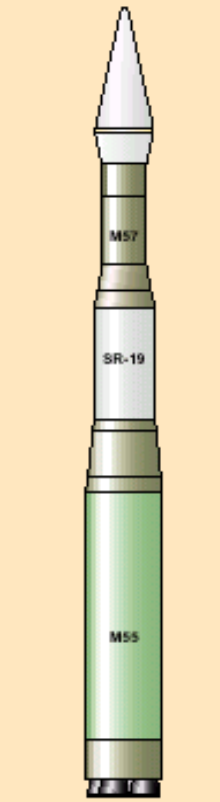
- Minuteman derivatives
  - Larger (size, weight) payload
- Peacekeeper
  - Deactivation and re-use
  - Target launch vehicle and space launch vehicle

MINUTEMAN VARIANT

U.S. AIR FORCE

SMC DETACHMENT 12

RSLP



▲ M55 / SR19 / M57 (TLV)

A

▲ M55 / SR19 / Orion 50XL (SLV)

B

▲ M55 / SR19 (TLV)

C

▲ M55 / SR19 / SR19 (TLV)

D

Minotaur XL

E

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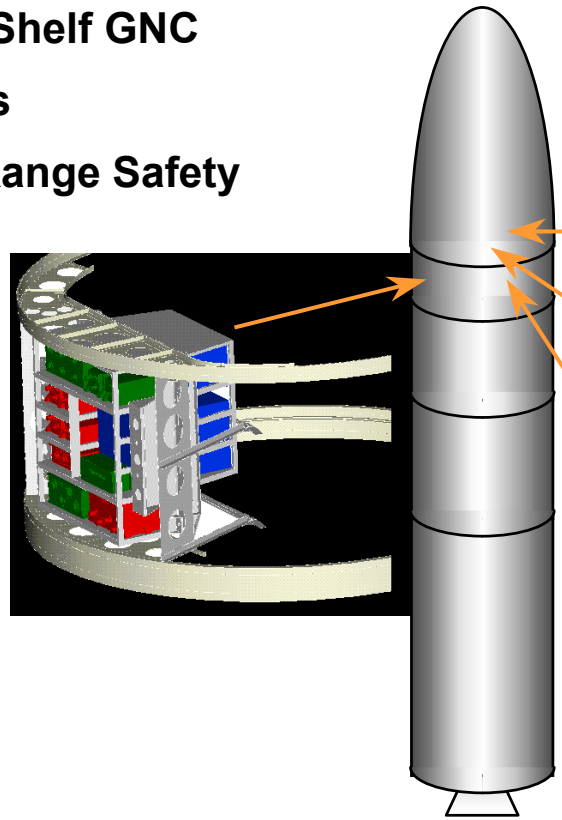
PEACEKEEPER VEHICLE CONCEPT

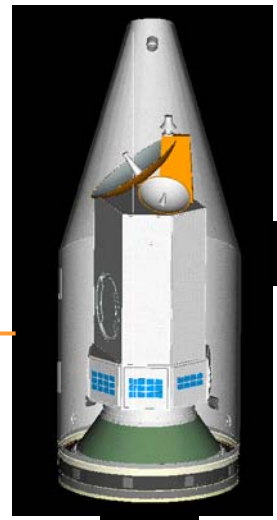
U.S. AIR FORCE

RSLP

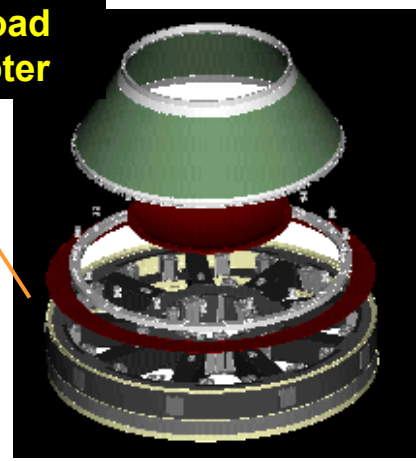
- **Avionics**
  - New Off-the-Shelf GNC
  - New batteries
  - Repackage Range Safety Systems



New Payload Fairing



Commercial Payload Adapter



Retain Existing Deployment Module

U.S. AIR FORCE

INITIATIVES

SMC DETACHMENT 12
RSLP

- Minuteman Policy Memo
  - Consistent with AF PMD, 22 Mar 00
  - RSLP solely manages Minuteman based launch vehicle
  - Applies to Peacekeeper as well

- Serve as BMDO's "Launch Vehicle Center of Excellence"
  - Manage all target launch vehicle development and launch services

WHAT RSLP DOES FOR AF SPACE COMMAND

- ILRP
- PK deactivation/reuse
- Support past efforts (CBM)
- Mk 11 storage
- Aging Surveillance share of data
- CAV support
- Minuteman IV
- Guidance/RV Aps R&D launches

U.S. AIR FORCE

ROCKET SYSTEMS LAUNCH PROGRAM

SMC DETACHMENT 12

RSLP

Forging the Shape of Military Space for the 21st Century

OVERVIEW

- MISSION, VISION, GOALS, TEAM, TASKING, FUNDING, RECENT ACHIEVEMENTS, FUTURE MISSIONS
- ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)
- DOD SPACE TEST PROGRAM (STP)
- R&D SPACE & MISSILE OPERATIONS PROGRAM (RDSMO)
- WRAP-UP

DEPARTMENT OF DEFENSE
SPACE TEST PROGRAM (STP)

LT COL PERRY G. BALLARD
ACTING PROGRAM DIRECTOR
29 JUNE 2001

STP MISSION

- Provide spaceflight and on-orbit operations for research and development programs approved by DoD Space Experiments Review Board (SERB)
- Conduct space test missions supporting the maximum number of DoD SERB-ranked payloads possible in a timely manner, consistent with SERB ranking, funding constraints, launch opportunity
- Provide necessary management, training, expertise, logistics to support these missions--cradle to grave
- Fund and/or provide: Mission design studies, Spacecraft, Payload integration and test,Launch, On-orbit operations
- Employ Space Shuttle, International Space Station (ISS), and expendable launch vehicles (ELVs)
- Provide services for non-SERB programs on a reimbursable basis
- Serve as the DoD Single Access to Space Shuttle and ISS (both SERB and non-SERB payloads)

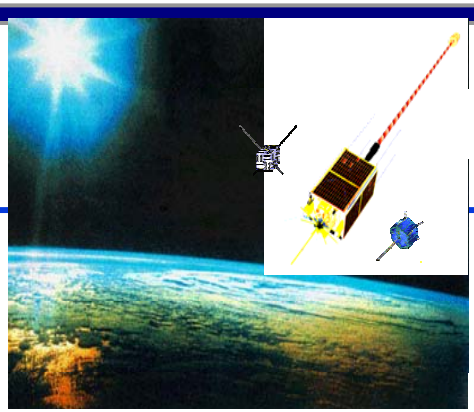
STP is a DOD program; USAF is the executive agent for this program

KODIAK STAR

U.S. AIR FORCE

SMC DETACHMENT 12

STP



Mission

Joint NASA-STP mission to launch NASA's Starshine-3, STP's PICOSat, STP's PCSat, and STP's Sapphire using a NASA Athena I LV.

Military Relevance

PICOSat: A 67 kg microsatellite built by Surrey Satellite Technology Limited (SSTL) with Foreign Comparative Test Program funds. PICOSat carries four SERB experiments that validate new battery technology, improve sensor performance, improve navigation accuracy, and demonstrates remote sensing techniques.

PCSAT (Prototype Mobile Communications Satellite): Built and operated by USNA to educate USNA engineering students and track USNA ships.

Sapphire: A joint USNA/University of Washington St Louis experiment to give USNA midshipmen experience in the command, control, and operations of a satellite.

Launch

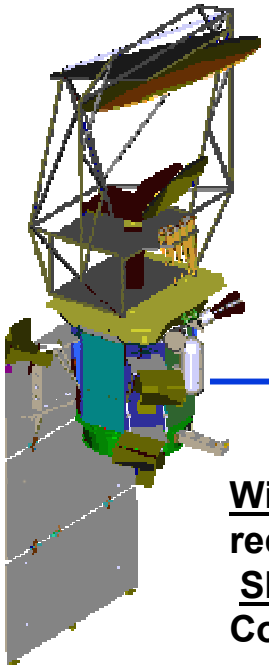
Kodiak Star will use a NASA Athena I to place the spacecraft into 67 degree 800 km circular orbit. The current launch date is 31 Aug 01 from Kodiak AK

Operations

- PICOSat will be operated by SSTL in UK and secondary ground site at USAFA
- PCSat & Sapphire will be operated by US Naval Academy

CORIOLIS

STP



Mission

The Coriolis Mission Consists of Two Experiments:

WindSat: Sponsored by ONR, Built by NRL, Is a Passive Polarimetric Radiometer Which Will Measure Ocean Surface Wind Speed and Direction.

Solar Mass Ejection Imager (SMEI): Sponsored by AFRL, Will Image Coronal Mass Ejections to Predict Geomagnetic Disturbances and their effects on Comm, Navigation (GPS Scintillation), Surveillance, and Spacecraft Charging.

Military Relevance

WindSat: Improved Battlespace Awareness (#1 unfilled remote sensing requirement of the Oceanographer of the Navy; key parameter of NPOESS IORD)
SMEI: Supports Mission Area Deficiencies Under Space Control & Satellite Control MAPs

Launch

Titan II, ILC 15 Mar 02 (launch in Aug 02), SLC-4W, Vandenberg AFB

Operations

First Year: SMC/TEO out of the Research, Development, Test & Evaluation Support Complex (RSC) at Kirtland AFB

Years 2-3: SMC/TEO out of RSC or NRL out of their Blossom Point Tracking Facility

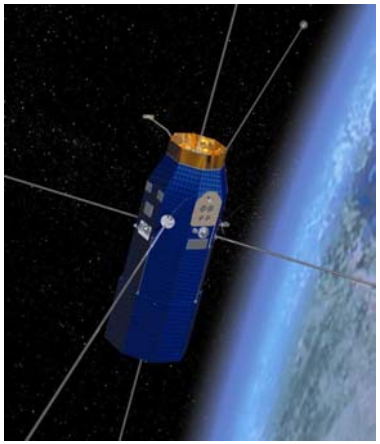
COMMUNICATION/NAVIGATION OUTAGE FORECASTING SYSTEM (C/NOFS)

U.S. AIR FORCE

SMC DETACHMENT 12

STP

Mission



C/NOFS will demonstrate the ability to predict the occurrence and strength of ionospheric disturbances which cause scintillations. Scintillation disrupt space-based communication, navigation, and surveillance systems. The payload consists of seven instruments. AFRL/VS is the mission Principal Investigator and payload development manager. The instruments and Co-Investigators are:

C/NOFS Occultation Receiver for Ionospheric Sensing & Specification (**CORISS**)-The Aerospace Corporation
Digital Ion Drift Meter (**DIDM**) - AFRL/VSB
Planar Langmuir Probe (**PLP**) - AFRL/VSB
Vector Electric Field Instrument (**VEFI**) - NASA/GSFC
Ion Velocity Meter (**IVM**) - University of Texas at Dallas
Neutral Wind Meter (**NWM**) - University of Texas at Dallas
Coherent Electromagnetic Radio Tomography (**CERTO**)-Naval Research Lab

Launch

Pegasus XL, ILC 31 Oct 03, from Alcantara Launch Center, Alcantara, Brazil.

Operations

SMC/TEO out of the Research, Development, T&E Support Complex (RSC), KAFB.

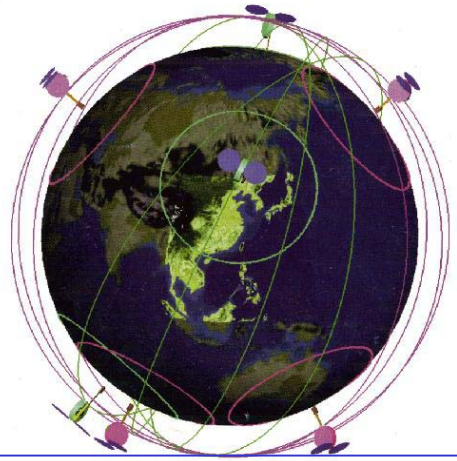
C/NOFS MILITARY RELEVANCE

- C/NOFS will demonstrate the ability to predict the occurrence and strength of a phenomenon known as “equatorial spread F” - ionospheric disturbances in the equatorial region which cause scintillations
  - Scintillations are random fluctuations in signal phase and amplitude that develop when radio waves pass through electron density irregularities
  - Scintillation degrades the performance of communication, navigation, and surveillance systems with radio wave links to space
- With scintillation forecasts, the warfighter can modify mission plans and prevent potential mission failures by optimizing and tailoring communications routes, paths, and/or priorities and effectively use satellite communication, navigation, and surveillance assets
- Military Relevance Indicators
  - Ranked #1 on the ‘97, ‘98, and ‘99 SERB lists
  - #1 USAF Advanced Concept Technology Demonstration (ACTD) program in 2000
  - National Security Space Architect’s Space Weather Architecture Study (1999) identifies ionospheric scintillation and forecast (including equatorial scintillation) as a National Security priority
  - Documented in AFSPC Space Force Enhancement MAP; Long and Short Term AFSPC S&T Priority; Supports 4 of top 5 near-term prioritized needs in AFSPC Strategic Master Plan
  - Development of Space Weather Sensors and Models Called for in CINCSPACE IPL

CONSTELLATION OBSERVING SYSTEM FOR METEOROLOGY, IONSOPHERE, AND CLIMATE (COSMIC)

MISSION:

COSMIC is a joint Taiwan / US partnership to launch a constellation of **six microsatellites** to 400km 72 deg



- Will collect atmospheric remote-sensing data for weather prediction, climate, ionospheric, and geodetic research.
- Three science payloads for terrestrial and space weather research and prediction, climate monitoring, and geodesy.
  1) GPS occultation receiver
  2) Tiny Ionospheric Photometer (TIP)
  3) Triband Beacon Transmitters (TBB).

RELEVANCE:

COSMIC (ONR-910) ranked 8th on the 1999 SERB List. Will extend current global weather forecasting accuracies 12-24 hours.

LAUNCH:

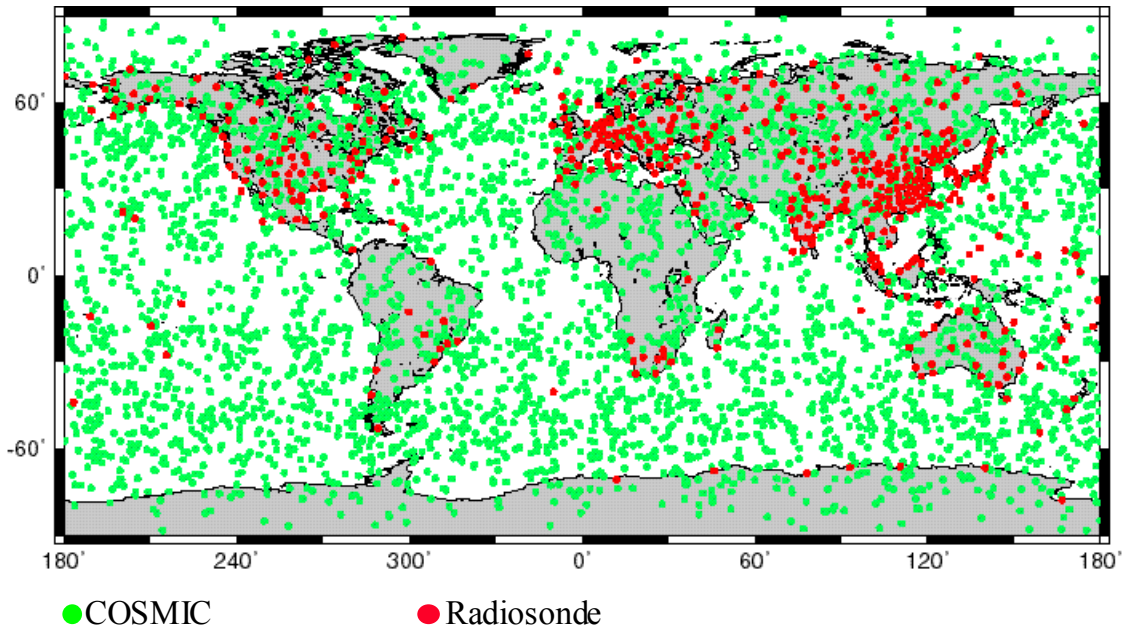
COSMIC presently plans to launch on an Minotaur Launch Vehicle in early 2005 at Vandenberg AFB.

OPERATIONS:

NSPO in Taiwan operate satellite constellation. Data will be processed by the COSMIC Data Analysis and Archive Center (CDAAC) in Boulder, Colorado and copied to the Taiwan Analysis Center for COSMIC (TACC).

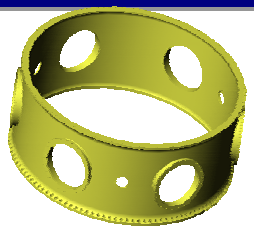
COSMIC

COSMIC vs. Radiosonde - 24 Global Coverage



SUMMARY: COSMIC is a joint Taiwan / US partnership to provide an unprecedented 3000 atmospheric soundings globally per day that will input directly into and thus increase the accuracy of atmospheric models. COSMIC consists of six space craft in three orbital planes.

EELV SECONDARY PAYLOAD ADAPTOR (ESPA)



Mission

The EELV Secondary Payload Adapter (ESPA) project is a joint program between AFRL and STP. ESPA is a national capability, designed to use excess lift capacity on Evolved Expendable Launch Vehicle (EELV)-Medium and EELV-Intermediate boosters to provide low-cost launches for small satellites. ESPA can carry up to six small satellites weighing up to 400 pounds each, plus a primary payload weighing up to 15,000 pounds. After conducting a demonstration launch, AFRL and STP hope to "commercialize" ESPA - making it available to industry for use on future DoD, NASA, and commercial EELV missions for all interested users.

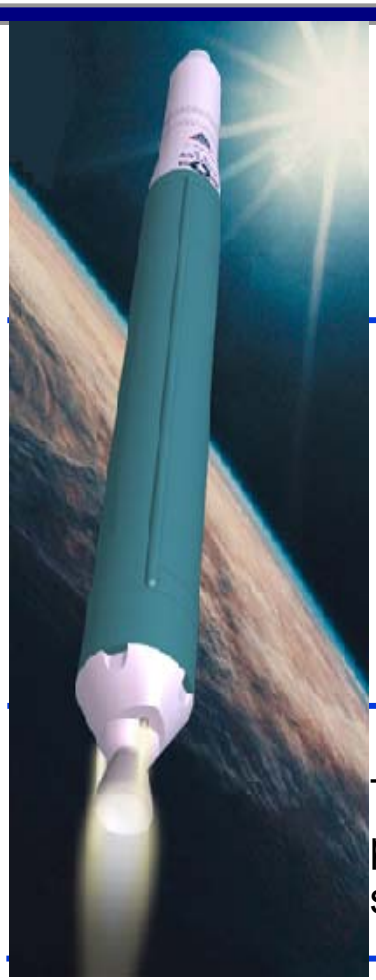
Military Relevance

The goal of ESPA is to reduce small satellite launch costs to less than $2-$3M per spacecraft, and provide a much-needed launch capability for the US small satellite community.

Launch

ESPA's first launch is currently planned to be on STP's Delta IV-M (MLV-05) in FY05. However, an additional flight ESPA can be manufactured should an earlier opportunity arise.

MEDIUM LAUNCH VEHICLE 2005



Mission

STP is provided a Medium Class Delta IV by AFSPC to be launched in the first quarter, FY05. Our goal is to fly as many SERB payloads as possible, utilizing the maximum margin available, within a reasonable amount of risk. Total Mission Cost Is $386M--STP Investment is $49M.

Manifest

- Primary Spacecraft is IOMI/GIFTS/IMAGE
- EELV Secondary Payload Adapter with Spacecraft
  - TechSat-21 is allocated three slots
  - STPSat-1 is allocated one slot
  - NPSat1 is allocated one slot
  - One slot held in reserve

Launch

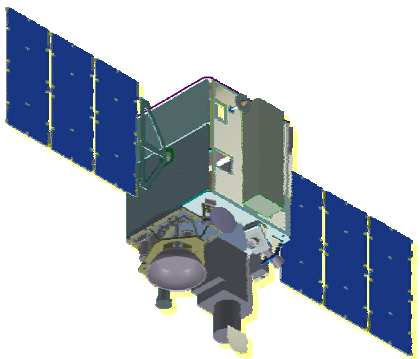
The current schedule for MLV 2005 is the 1st Quarter, FY05. The launch profile is 3100kgs to LEO from the Eastern Range. After deploying secondaries, the prime will be inserted into GTO.

Operations

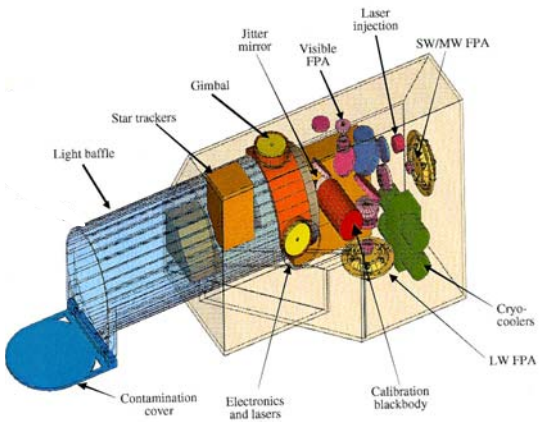
TBD based on payload requirements. TechSat 21 will be operated through the RSC.

GIFTS/IOMI/IMAGE

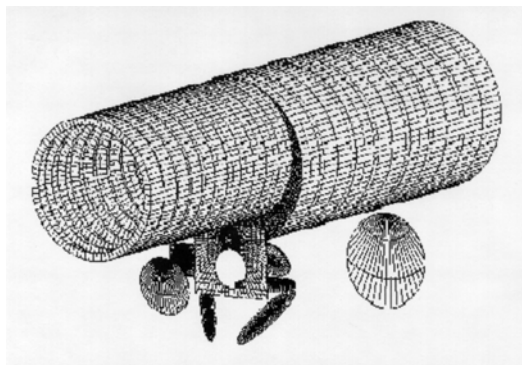
- IOMI--Indian Ocean METOC Imager--Office of Naval Research
  - **IOMI Sensor is GIFTS--Geosynchronous Imaging Fourier Transform Spectrometer (NASA EO-3 New Millennium Program)**
  - **IMAGE rideshare--Ionospheric Mapping and Geocoronal Experiment--Naval Research Laboratory**
  - **Demonstrates weather nowcasting to fulfill USN requirements--realtime info to IO**
  - **Validates next generation of GOES spacecraft**
  - **IOMI is #1 on the 2000 SERB, IMAGE is #5**



IOMI



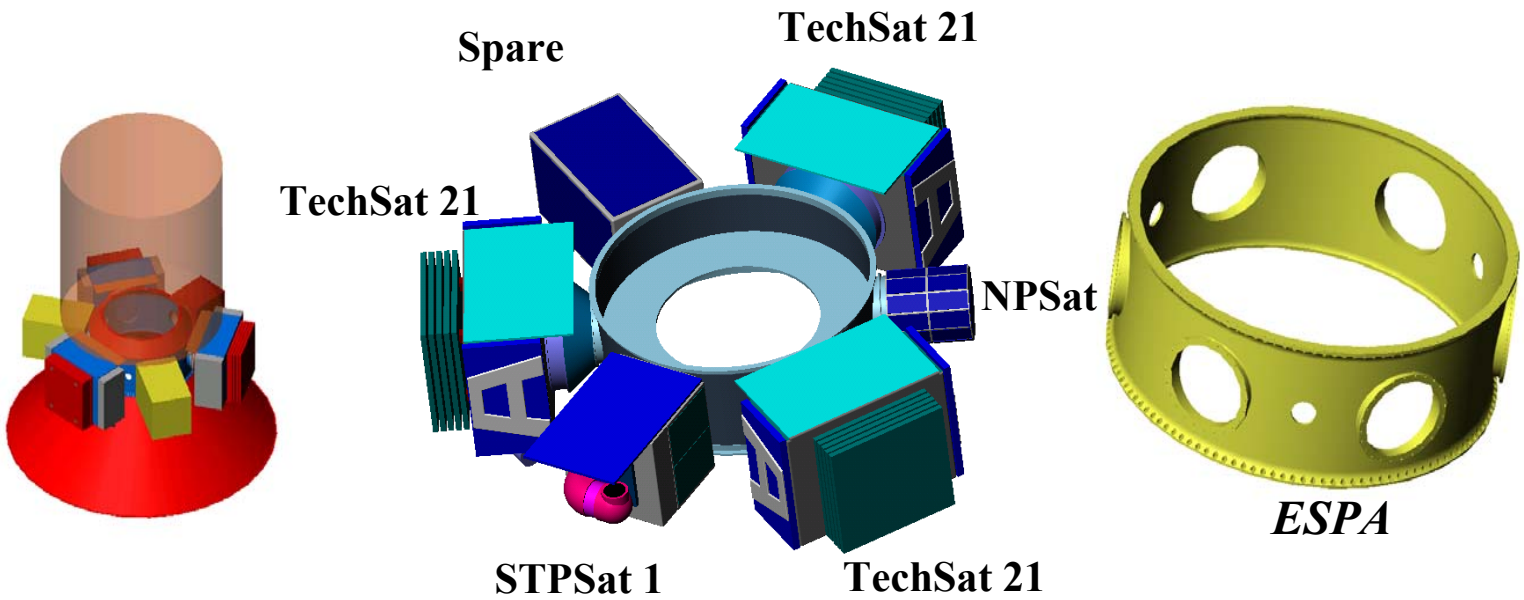
GIFTS



IMAGE

ESPA

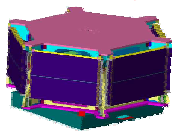
- ESPA--EELV Secondary Payload Adapter--Space Test Program and Air Force Research Lab
  - **Better utilizes EELV margins and provides standard access to space for small satellites**
  - **MLV-05 will be the first flight of ESPA**



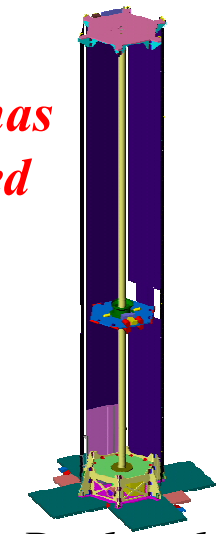
TECHSAT 21

- TechSat 21--Technology Satellite of the 21st Century--Air Force Research Lab
  - **3 spacecraft constellation demonstrating formation flying and SAR fusing**
  - **TechSat 21 is #3 on the 2000 SERB**

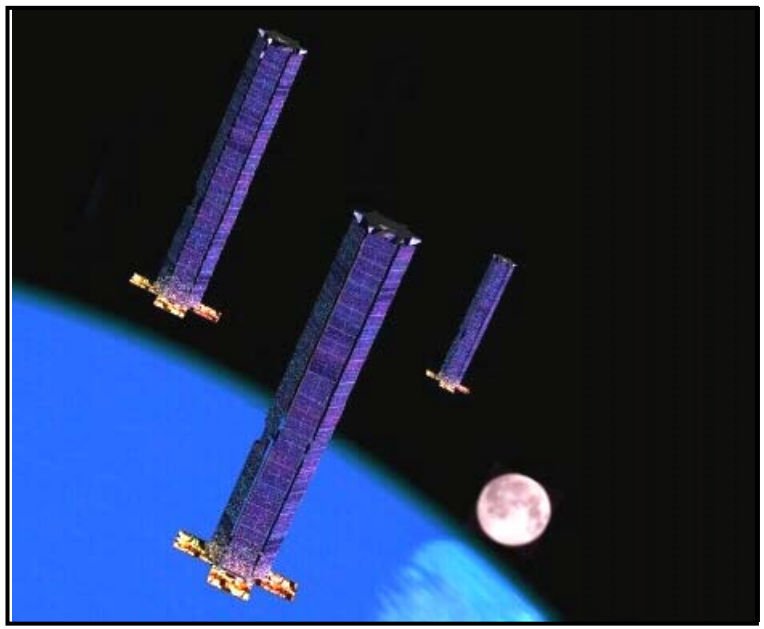
NOTE: Design has recently changed



Stowed



Deployed

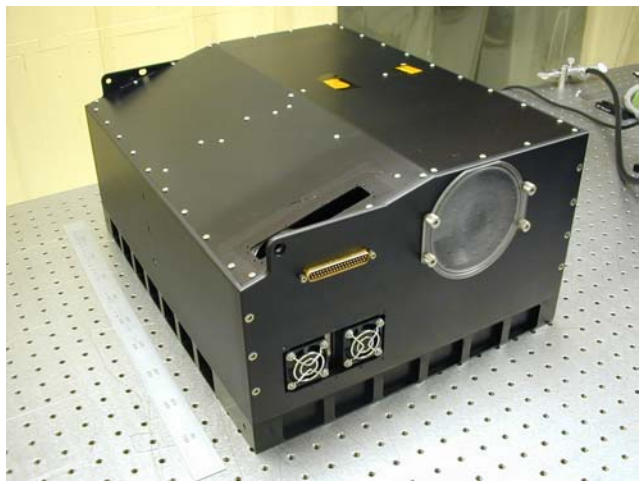


Forging the Shape of Military Space for the 21st Century

STPSat

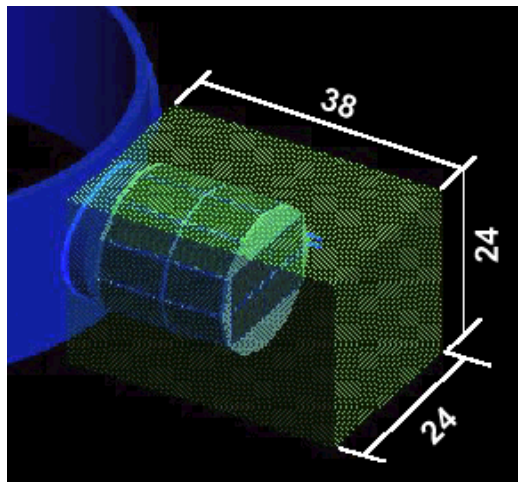
- STPSat--Micro- Satellite to be built by STP (Source Selection in process)
  - **Would house several experiments (possibly 6)--core will be SHIMMER**
  - **SHIMMER--Spatial Heterodyne Imager for Mesospheric Radicals Link --Naval Research Lab**
  - **Ideal sensor for Chemical & Biological Agent Detection, Middle atmosphere weather assessment and forecast capability --small, rugged, light-weight, no-moving parts optics package**
  - **SHIMMER is #4 on the 2000 SERB**

SHIMMER Experiment in Space Shuttle Configuration (risk reduction for STPSat-1)



NPSat

- NPSat1--Naval Postgraduate School Spacecraft Architecture and Technology Demonstration--Naval Postgraduate School (NPS)
  - **"Microsat" class spacecraft**
  - **Provides hands-on education for officer students at NPS**
  - **Demonstrate COTS technology in spacecraft architecture as a means of decreasing development time, and increasing reliability in software development**
  - **NPSat1 is #29 on the 2000 SERB**



DoD Management of Secondary Space Payloads

Det 12/STO

U.S. AIR FORCE

BACKGROUND

SMC DETACHMENT 12
STP

- EELV Launch Margin--FY00 study identified up to 2000lbs available
- STP is trying to improve secondary payload access to space (ESPA)
- SAF/SX convened a meeting to identify a uniform approach for manifesting secondary space payloads--27 Jun 00

  ACTION: Identify a DoD OPR to manage all secondary payloads
- EELV ORD includes requirement for support of secondaries
- PMD already allows this--no coordinated direction/resources

PURPOSE: Propose that the mission of STP be expanded to include all secondaries and launch margins for DoD

IMPLEMENTATION

- Space Experiment Review Board customer
  - Must have SERB validation to receive any STP support
  - Process is well documented and proven
- Reimbursable customer
  - Customer would fund dedicated Aerospace and SETA support
  - Treated as a any customer--differentiated after opportunities identified
- Process will work for DoD payloads on non-DoD launch vehicles, not just for payloads on DoD launchers
  - Recent agreement to launch 6 SERB payloads on a NASA procured Athena 1 is an example (Kodiak Star)
  - Strong relationship with STS/ISS

BENEFITS

- Leverages STP's existing expertise
- Establishes a single face to the secondary payload customers
  - Saves these customers from having to spend resources separately pursuing opportunities with multiple launch service providers
- Establishes a single face to the launch service providers
  - Saves these organizations from having to spend resources responding to multiple requests for their services
- Puts AF in position of "stepping up to the plate" once again to satisfy a space mission requirement for DoD

SECONDARY PAYLOADS SUMMARY

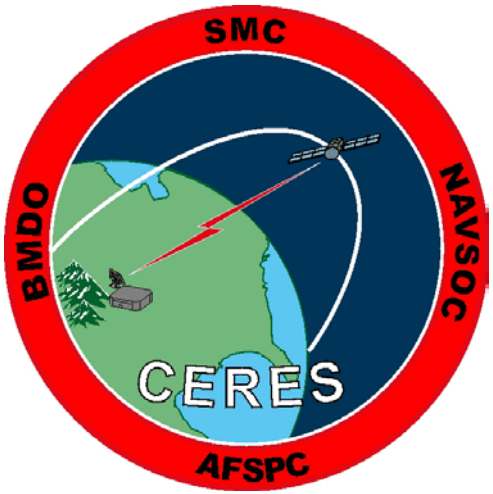
- No single manifesting entity exists except for SERB payloads
- Excess launch capability exists
- Non-SERB secondary customers exist
- For success STP must “manage” all DoD ELV margins
- SECDEF direction to services and agencies should be unambiguous
- Resources are the critical drivers--they must be in place

Opportunity to develop process prior to operational EELV is now

OVERVIEW

- MISSION, VISION, GOALS, TEAM, TASKING, FUNDING, RECENT ACHIEVEMENTS, FUTURE MISSIONS
- ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)
- DOD SPACE TEST PROGRAM (STP)
- R&D SPACE & MISSILE OPERATIONS PROGRAM (RDSMO)
- WRAP-UP

RESEARCH AND DEVELOPMENT SPACE AND MISSILE OPERATIONS (RDSMO)



LT COLONEL TROY IRWIN
ACTING PROGRAM MANAGER
29 JUNE 2001

RESEARCH AND DEVELOPMENT SPACE AND MISSILE OPERATIONS (RDSMO)

U.S. AIR FORCE

SMC DETACHMENT 12

RDSMO

- Prepare for and conduct on-orbit operations of USAF, DoD, and other R&D and post-operational satellites
  - STP, AFRL, NRL, DOE, et al
  - DSP, DSCS, et al
- Provide a space operations testbed for rapid prototyping, test and evaluation, and system activation
- Provide worldwide access to space assets where fixed sites do not exist
  - Factory and launch base compatibility testing
  - Booster and on-orbit satellite support

45 Spacecraft or Booster Supports in Planning, Readiness or Operation in 2001!

DEPLOYABLES

RDSMO

Deployable TT&C Systems

- Transportable Vehicle Checkout Systems (TVCS)
- S-Band Transportable Ground Station (STGS)
  - S-band, 12’ Antenna, Autotrack
- Transportable S-Band Terminals (TST)
  - S-band, 8’ Antenna
- Transportable Space Test and Evaluation Resource TSTR)
  - Mobile ARTS Core and 23’ Antenna

RDT&E SUPPORT COMPLEX (RSC) KIRTLAND AFB, NM

U.S. AIR FORCE

SMC DETACHMENT 12

RDSMO

- VO's on-orbit RDT&E operations complex
- Uses COTS-based real time architecture (COBRA)
- Currently supporting ARGOS, TSX-5, MightySat II.1, and POAM III on prime system (AFSCN/S-Band)
- Currently supporting RADCAL and TEX on stand-alone PC system (UHF)

Center for Research Support (CERES)
Schriever AFB, CO

U.S. AIR FORCE

SMC DETACHMENT 12
RDSMO

- Space operations testbed
  - Rapid Prototyping
  - Test & Evaluation
  - Activation
- Leverages access to ground and space assets
  - Residual satellite operations
  - State of the art ground systems
  - AFSCN connectivity

DET 12/VO

RDSMO

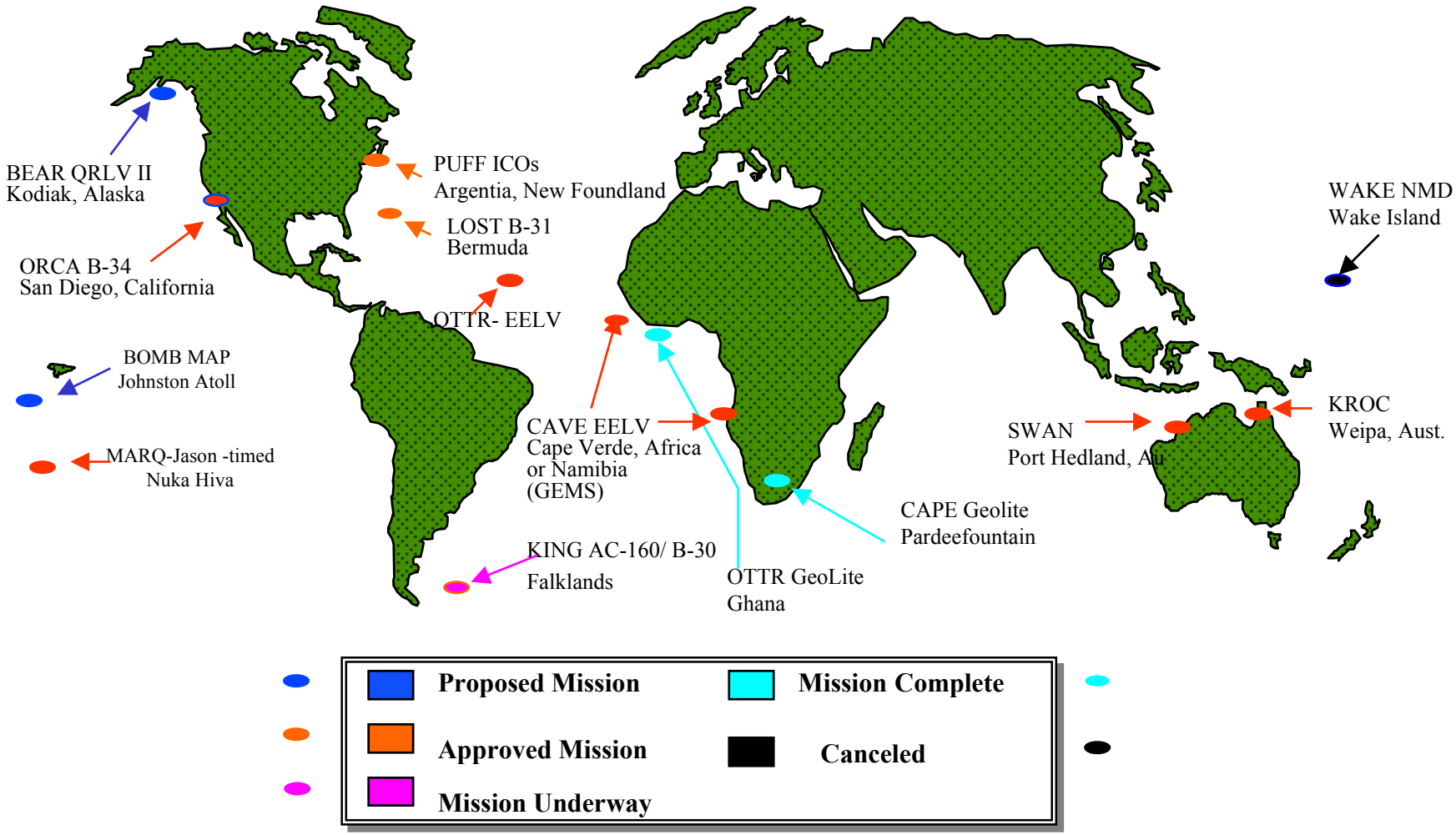
Col (S) Mark Neice
Program Manager
Lt Col Troy Irwin
Deputy Program Manager

Program Control **FMV** **Mrs Alberta Campbell**	**Contracting** **PKV** **Mrs Dina Chavez-Mann**
Center for Research Support **VOC** **Maj Rob Hessin (I/B 9/01)** **Capt Mari Carpenter - Acting Ch**	**Deployables** **VOD** **Mr Al Reagan**
Engineering **VOE** **Lt Col LeRoy Smith**	**RDT&E Support Complex** **VOF** **Maj John Santacroce**
Test Execution **VOT (eff 7/1/01)** **Lt Col Steve Davis (I/B 8/01)** **Maj Pat Tom - Acting Ch**	

DEPLOYABLES' OVERSEAS MISSIONS THRU JUL 02

U.S. AIR FORCE

RDSMO



XSS-10

- Issue - XSS-10 is riskier than typical RSC mission
  - One chance mission, cost constrained, high visibility
  - Ops concept and requirements continually maturing
- Impact
  - Significant 01 cost growth to implement risk mitigation steps and accommodate requirements changes
- Action to date
  - Implemented comprehensive risk management program
    - Added training & rehearsals, better documentation, etc
  - Revised cost estimate submitted to AFRL; funding in work
- Way ahead - AFRL and SMC/VO continue to track closely
  - Believe successful execution of current readiness plan will result in acceptable residual risk

TIPP PROJECTS

- **Issue - AFMC AOs are zeroing out RDSMO TIPP projects beginning in 02**
  - **Rationale: Operational command doesn't do DT&E**
- **Impact - Kills RSC and Deployables I&M program**
- **Action to date**
  - **Issue elevated to AFMC/DO (O-7) and AF/TER (SES) levels**
  - **Tracking P-Plan wording**
- **Way ahead**
  - **Continue tracking P-Plan development**
  - **Elevate to SMC/CC if necessary (don't need help yet)**

TEST EXECUTION

29 JUNE 2001

DET 12/VOT MISSION

RDSMO

- Evolving Mission:
  - Provide DT&E Support to Space Systems
    - Full Spectrum Support
      - **Planning → Execution (as needed)**
      - **Advisors → Test Conductors → Test Directors (as needed)**
    - Focus: New programs (X-37, SMC/AD-AFRL/DE, SBL)
  - Test Policy, Plans and Programs for SMC
    - Space and Missile Single Face to Customer (SFTC) IAW AFI 99-101
    - TEMP Reviews
    - Coordinate Space Test Infrastructure Requirements and Reliance Efforts for the Air Force

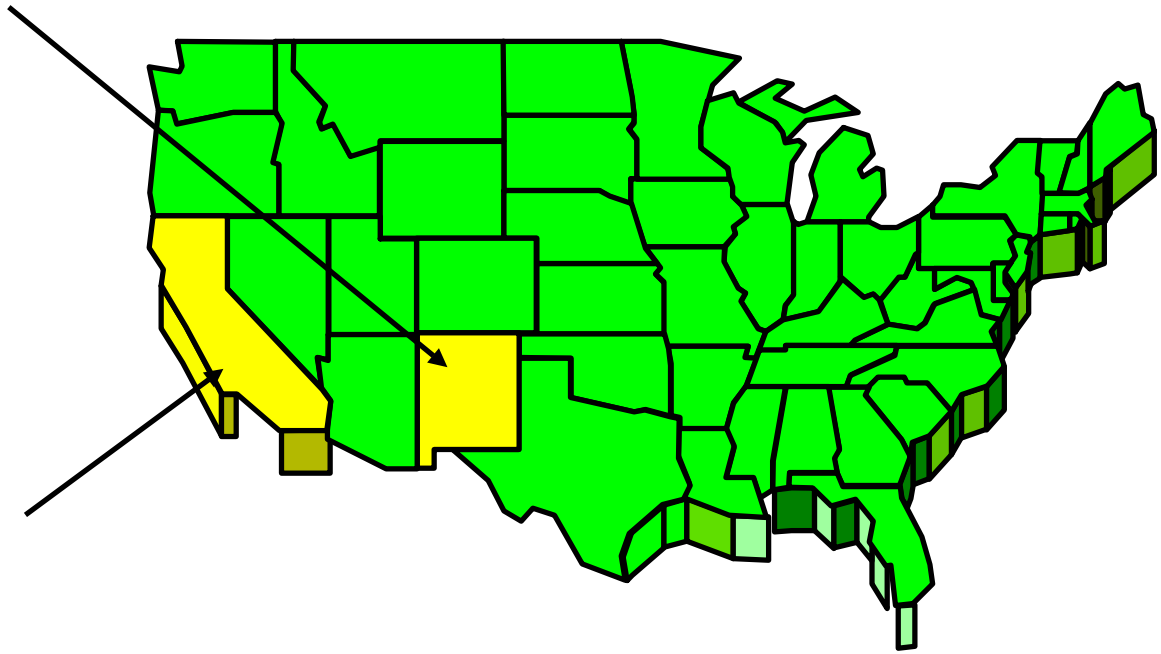
DET 12/VOT MISSION

U.S. AIR FORCE

RDSMO

Kirtland AFB

- **Active Test Planning/Execution**
- **SFTC for Space**



LA AFB

- **TE Plans/Policy**
  - TERIPT, CTEIP
- **TEMP reviews**
- **Det 12 Liaison**

TEST EXECUTION

RDSMO

- VOT Brings Test Expertise to the fight!
  - DCX (1993-96):
    - SDIO/Phillips Lab run program w/ McDonnell Douglas
    - Objectives:
      - **Austere Landing**
      - **Small Ops Crew**
      - **Vertical Landing**
      - **Quick Turn**
    - 12 Successful Flights (8 AF, 4 NASA)
    - Evolving VOT Role:
      - **Initially at request of SMC/CC, then indispensable team member**
      - **Observers**
        - **Ground Crew**
          - **Test Director**
            - **Deputy for Flt Test**

TEST EXECUTION

U.S. AIR FORCE

SMC DETACHMENT 12
RDSMO

- VOT Brings Test Expertise to the fight!
  - X-40A (1997-1998):
    - AFRL-run program w/ Boeing Seal Beach
    - Objectives:
      - **Demonstrate autonomous Approach & Landing of Low L/D shaped vehicle**
    - 1 Successful Flight @ Holloman AFB
    - VOT Role:
      - At request of AFRL, Test Director/Flight Test Lead

TEST EXECUTION

- VOT Brings Test Expertise to the fight!
  - X-37 (1999-present):
    - NASA Marshall/Boeing Seal Beach Program
    - Objectives:
      - **Fly autonomous, orbital X-vehicle – demonstrate technologies to lower cost to and while operating in LEO**
    - Multiple Phases
      - ✓ X-40A Phase II – **Subscale atmospheric flight test (7 successful flts)**
      - X-37 AIT **– Full Scale Atmospheric Flight Test**
      - X-37 Orbital Missions **– Shuttle or ELV, 3-day msn, autonomous reentry, approach, landing**
    - VOT Role: Test Ops Support/Integrated Flight Ops Crew

TEST EXECUTION

U.S. AIR FORCE

SMC DETACHMENT 12
RDSMO

- VOT Brings Test Expertise to the fight!
  - Future Programs
    - SMC/AD, AFRL/DE, SBL
    - Evolving VOT Role:
      - **Advisors → ????**

Det 12 Test Execution Vision: Focus on definable tasks and requested/funded program test support, grow expertise and resources, demonstrate value-added, and become sought-after center of excellence for space test

RDSMO RE-CAP

- Like a lab…
  - If we need something that doesn't exist, we invent it
- Like a SPO…
  - We develop and acquire things
- Like a test center…
  - We conduct test and evaluation on space and ground systems
- Like an operational unit…
  - We operate satellites and ground systems
- Like a maintenance organization…
  - If something breaks, we fix it
- Like a SPO…
  - When a satellite or ground system's useful life is over, we dispose of it

OVERVIEW

- **MISSION, VISION, GOALS, TEAM, TASKING, FUNDING, RECENT ACHIEVEMENTS, FUTURE MISSIONS**
- **ROCKET SYSTEMS LAUNCH PROGRAM (RSLP)**
- **SPACE TEST PROGRAM (STP)**
- **R&D SPACE & MISSILE OPERATIONS PROGRAM (RDSMO)**
- **WRAP-UP**

Wrap-up

Col James A. "Mouse" Neumeister

29 June 2001

Detachment 12
Space and Missile Systems Center

Questions?